

Bird Surveys at Curracabundi National Park (2010-2013)

Penny Drake-Brockman

20 Manning Street, Gloucester, NSW 2422, Australia. penny@pennydb.org

Between January 2010 and February 2013 ten survey campaigns were conducted involving 21 survey sites. A total of 126 bird species were recorded for the area. 111 of these species occurred at the survey sites. Five species listed as Threatened and Endangered under the New South Wales *Threatened Species Conservation Act 1995* were present, and all migratory movements observed were noted. The range of species recorded demonstrates the importance of Curracabundi National Park as a reserve for eastern Australian woodland birds, many of which are in decline as urbanisation and land clearing continues to eat away at their habitat. The presence of five threatened species further supports the gazettement of the area as Wilderness and National Park. The results of this study highlight its value as a vital link in the Great Eastern Ranges Corridor.

INTRODUCTION

Following discussions in 2009 with Terry Evans, then Manager of the Gloucester office of the National Parks and Wildlife Service (NPWS) and Penny Drake-Brockman of the Gloucester Environment Group (GEG), and agreement between NPWS Head Office Sydney and the GEG, a three-year project was agreed to assess the presence and numbers of avian species on the property *Karamea* (31° 39' 57" S 151° 44' 54" E), a newly gazetted section of Curracabundi National Park. The area to be surveyed included the Homestead on the northern bank of the Barnard River, and the catchments of Curricabark and Mernot Creeks beyond the steep ridge behind the Homestead to the west and south-west. In addition Terry Evans requested that all avian migratory observations be recorded.

The eastern section of Curracabundi National Park, comprising the property *Karamea* is 340 km north of Sydney (**Figure 1**). It is located in a rain shadow with on average a lower rainfall than the surrounding Gloucester-Nowendoc area, with cold winters and hot summers. The area surveyed is characterised by extremely steep forested slopes and almost impassable pinches created by the Barnard River and its tributary creeks, with sections of pasture land in the valleys and along water courses. Other than cedar extraction and some larger tree felling, much of the original timber remains with only one large section of partially cleared land in the Curricabark valley behind the steep ridge at the rear of the Homestead and cattle yards, small clearings on summits along

the trails, and the land surrounding the house and on the flats either side of the Barnard River. The remote areas are currently being allowed to regenerate (Ian Jack Heritage Consulting 2007).

Karamea's 2,640 hectares were gazetted in September 2006 into Curracabundi National Park along with the properties of *Rock Glen*, *Lea Hurst* and *Watchimbark*, and Brett, Camels Hump, Mernot and Monkeycot nature reserves, which connect to Woko National Park to the south-east, and will form a section of the Great Eastern Ranges Corridor. A large section of the park (19,914 hectares) was gazetted Wilderness in 2011. Access is via Giro on the original (pre-1959) Gloucester/Nowendoc dirt road through private land and at the time of writing this report, access remained subject to agreement with the Giro landowners (NPWS 2014).

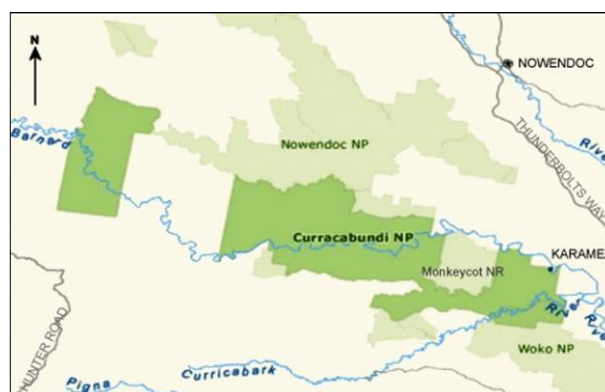


Figure 1. Map showing Curracabundi National Park and *Karamea* homestead.

Previous avian studies conducted to the west of *Karamea* include the following:

- E. L. Hyem's (1979) work on owls in areas adjoining Mernot and Monkeycot and his publication "Observations on Owls in the Upper Manning River District, NSW" was the culmination of 30 years observing Sooty Owl *Tyto tenebriosa*, Masked Owl *Tyto novaehollandiae*, Eastern Barn Owl *Tyto alba delicatula*, Powerful Owl *Ninox strenua*, and Southern Boobook *Ninox novaeseelandiae*.
- NPWS bird census, 5-9 May 2004 led by Trish Waters, NPWS ranger, and Tod Sonderquist, at Watchimbark Nature Reserve, when 54 species were recorded.
- The National Parks Association three-day survey of birds, plants, mammals and spiders, 12-15 April 2007, based at Glen Rock, with Stephen Debus leading a group of birdwatchers, when over 70 species were recorded, including Southern Boobook, Masked and Powerful owls.

METHODS

Owing to the extreme steepness of access tracks, thickly vegetated slopes and creek crossings at the back of the Homestead, 15 transects were initially selected along the vehicle tracks bordering Mernot and Curricabark Creeks, with a further two at the Homestead and Barnard River, covering as wide a variety of habitat/vegetation types as possible. An additional three sites were selected following NPWS track clearance at the far end of the Mernot track and one site on Curricabark when flooding prevented access to the three far sites, making a total of 21 sites. Sites were to be surveyed four times a year for three years starting from January 2010, and star pickets were set up with GPS WGS84 co-ordinates taken. Sites were registered with Birds Australia, now BirdLife Australia (BLA), and Atlas forms submitted to the BLA Birddata archive following each survey event. Sites could only be accessed in robust 4WD vehicles due to the ford crossings and steep, stony and often slippery trails. The **Appendix** contains details of the survey site locations, habitat at each site and BLA Birddata site ID numbers. Unfortunately the intensive short duration survey method used in this study did not provide time for detailed assessment of bird behaviour and consequently breeding behaviour was under-reported.

The data acquisition design used the standard BLA 2ha survey method which involves sampling bird popul-

ations at fixed sites of 2ha size for a period of 20 minutes. The principle underlying this design is that competent observers will locate most (>80%) bird species present in a 2ha area during 20-minute surveys conducted when birds are active. Surveys were conducted as early in the day as possible to ensure high levels of bird activity, with species present being recorded as well as an estimate of the number of each species. Collecting records in this systematic manner facilitates inter-site comparisons of bird populations as well as variations at sites between seasons and years. At each site 20-minute surveys were conducted on foot by two or more participants, walking 100 metres along the track both sides of a centre point, recording species both visually and by call 50 metres either side of the track, including fly-overs together with an estimate of the number of each species present. Significant bird activity was noted, in particular the presence of vulnerable or endangered species, breeding, foraging, and migration.

One brief night-time survey for owls was carried out in November 2011 when a Southern Boobook responded to call-back at Mernot Site 3. During all visits night-birds heard from the Homestead area and all species seen or heard outside of survey sites and time limits were recorded, providing a more complete species list for the park. However, since these additional records were not acquired in a systematic manner, their use in data analysis is limited.

Out of the projected 12 survey events, only 10 were completed due to extreme wet weather conditions outlined below. On some occasions 2ha sites were surveyed more than once at different times of day, but in each case only one of these duplicate surveys, held early morning and with the highest number of recorded species, was used for data analysis.

In particular, surveys were impacted by weather conditions at Barnard River, when heavy rain on several occasions in 2011 and 2012 caused delay or abandonment of surveys when the river flooded the causeway leading to the Homestead. In 2012 flooding dumped tons of gravel on the southern side of the causeway, sweeping the flats at Site 17 clear of weedy vegetation and a large dead tree, thus changing the habitat. Moreover, at Curricabark Creek flooding caused the creek ford to Site 12 and beyond to be inaccessible during the first survey visit. Site 12A was added on the second survey visit when it was not possible to cross the second ford, and this new site was surveyed eight times. Sites 13, 14 and 15 beyond the second ford could not be surveyed during the first three visits due to flooding and washout of the track, and were therefore surveyed seven times. Site 9 was missed in May 2010 and surveyed nine times. At Mernot Creek three new sites were created (MT1, MT2 and MT3) in September 2010 after the track beyond the ford at Site 7 was cleared by NPWS staff, and these sites were surveyed eight times.

RESULTS

A total of 126 species was recorded overall as detailed in **Tables 1A** and **1B**. This number included 111 species recorded during surveys at the 21 designated sites (**Table 1A**), and a further 15 species (**Table 1B**) recorded outside of the 20-minute survey time limit at the sites or in other areas of the park. Five species listed as threatened and vulnerable under the New South Wales *Threatened Species Conservation Act 1995*, were recorded at the 2ha survey sites or elsewhere in the park (**Table 2**).

Migratory movements

Migratory activity of species was noted as detailed in **Table 3**. It was observed that birds used the Barnard River as a route connecting the park to the Manning River, leading to the coastal belt. Migrating groups were observed in spring flying over the Homestead and the ridge behind to access the Curricabark valley and areas beyond, and vice versa in autumn. There is a high, thickly forested ridge on the east side of the Barnard River which would appear to force the birds to take a south-easterly route before they can turn north-east into the Manning valley.

Nocturnal species

Although night-time call-back was not carried out systematically, all sightings made or calls heard were recorded (**Table 4**).

Raptor species

Table 5 details all records of raptors. It was apparent that the pair of Wedge-tailed Eagles *Aquila audax*, regularly observed from the Homestead Site 17 and in the Curricabark valley, was resident in this section of the park. Sightings of Wedge-tailed Eagles over the ridge near Drovers Gate and beyond the Curricabark valley leading into Watchimbark, may have involved another territory. Two Nankeen Kestrels *Falco cenchroides* recorded in 2010 were not reported subsequently. The Black Falcon *Falco subniger* is fairly often recorded in the Hunter Valley (Stuart 1994-2014), but to the author's knowledge has not previously been recorded in the Gloucester area.

Reporting rates, abundance and distribution of species

The relative frequency of occurrence of the 111 bird species recorded during the 2ha surveys is indicated in **Table 1A**, in which the reporting rates (RR, which is the percent frequency of occurrence of a species in all 2ha surveys across the 21 survey sites) and the total number of each species seen in all the surveys gives an indication of relative abundance. The spread of the distribution of each species is indicated by the number of 2ha sites in which each species was recorded (e.g. the White-throated Treecreeper *Cormobates leucophaea* was widespread being recorded at 18 of the 21 2ha survey sites; see **Table 1A**).

Table 1A. Summary statistics for species recorded during 2ha surveys of 20 minutes duration in Curracabundi National Park between 2010 and 2013.

Common Name	Scientific Name	Number of survey sites recorded ¹	Maximum number in one survey	Total birds in all surveys	Reporting rate of all surveys ² (%)
Brown Quail	<i>Coturnix ypsilophora</i>	8	13	48	6.7
Pacific Black Duck	<i>Anas superciliosa</i>	4	11	36	6.2
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	1	1	1	1.4
Brown Cuckoo-Dove	<i>Macropygia amboinensis</i>	4	2	5	2.9
Bar-shouldered Dove	<i>Geopelia humeralis</i>	2	6	12	1.4
Wonga Pigeon	<i>Leucosarcia picata</i>	12	2	23	9.6
Wompoo Fruit-Dove	<i>Ptilinopus magnificus</i>	1	4	4	0.5
Topknot Pigeon	<i>Lopholaimus antarcticus</i>	3	13	20	2.9
Tawny Frogmouth	<i>Podargus strigoides</i>	1	1	1	0.5
White-throated Nightjar	<i>Eurostopodus mystacalis</i>	1	2	2	0.5
White-throated Needletail	<i>Hirundapus caudacutus</i>	2	25	33	1.0
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	2	2	7	1.4
Great Cormorant	<i>Phalacrocorax carbo</i>	1	1	1	0.5
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	1	23	26	1.9

¹ Surveys conducted at 21 sites.

² A total of 209 surveys were conducted.

Table 1A. Summary statistics for species recorded during 2ha surveys of 20 minutes duration in Curracabundi National Park between 2010 and 2013 (cont.)

Common Name	Scientific Name	Number of survey sites recorded ¹	Maximum number in one survey	Total birds in all surveys	Reporting rate of all surveys ² (%)
White-faced Heron	<i>Egretta novaehollandiae</i>	2	1	2	1.0
Black-shouldered Kite	<i>Elanus axillaris</i>	3	1	3	1.4
Brown Goshawk	<i>Accipiter fasciatus</i>	5	1	2	2.4
Grey Goshawk	<i>Accipiter novaehollandiae</i>	2	1	2	1.0
Wedge-tailed Eagle	<i>Aquila audax</i>	13	3	27	10.5
Nankeen Kestrel	<i>Falco cenchroides</i>	1	1	2	0.5
Brown Falcon	<i>Falco berigora</i>	3	1	4	1.9
Black Falcon	<i>Falco subniger</i>	1	1	1	0.5
Dusky Moorhen	<i>Gallinula tenebrosa</i>	2	1	2	1.0
Masked Lapwing	<i>Vanellus miles</i>	4	2	8	3.3
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	7	11	32	5.3
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	5	5	12	1.9
Musk Lorikeet	<i>Glossopsitta concinna</i>	1	4	4	0.5
Australian King-Parrot	<i>Asterus scapularis</i>	7	8	31	5.7
Crimson Rosella	<i>Platycercus elegans</i>	15	17	127	20.1
Eastern Rosella	<i>Platycercus eximius</i>	1	2	2	0.5
Pheasant Coucal	<i>Centropus phasianinus</i>	1	1	1	0.5
Eastern Koel	<i>Eudynamis orientalis</i>	8	2	10	3.8
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	2	3	6	1.4
Horsfield's Bronze-Cuckoo	<i>Chalcites basalis</i>	2	2	3	1.0
Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>	6	2	6	1.9
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	17	2	35	15.3
Brush Cuckoo	<i>Cacomantis variolosus</i>	12	2	13	5.7
Azure Kingfisher	<i>Ceyx azureus</i>	1	2	4	1.4
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	10	4	22	7.7
Sacred Kingfisher	<i>Todiramphus sanctus</i>	3	1	3	1.9
Dollarbird	<i>Eurystomus orientalis</i>	2	1	3	1.9
Superb Lyrebird	<i>Menura novaehollandiae</i>	3	1	3	1.4
White-throated Treecreeper	<i>Cormobates leucophaea</i>	18	3	55	25.4
Red-browed Treecreeper	<i>Climacteris erythroptis</i>	1	1	1	0.5
Green Catbird	<i>Ailuroedus crassirostris</i>	4	3	7	2.4
Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>	9	15	43	11.0
Superb Fairy-wren	<i>Malurus cyaneus</i>	20	30	540	46.4
Red-backed Fairy-wren	<i>Malurus melanocephalus</i>	8	6	39	4.8
Variegated Fairy-wren	<i>Malurus lamberti</i>	10	5	51	7.2
Southern Emu-wren	<i>Stipiturus malachurus</i>	1	4	5	1.0
Yellow-throated Scrubwren	<i>Sericornis citreogularis</i>	2	1	2	1.4
White-browed Scrubwren	<i>Sericornis frontalis</i>	16	6	91	27.8
Large-billed Scrubwren	<i>Sericornis magnirostra</i>	7	3	12	3.8
Speckled Warbler	<i>Chthonicola sagittata</i>	4	2	8	3.8
Brown Gerygone	<i>Gerygone mouki</i>	15	10	131	18.2
White-throated Gerygone	<i>Gerygone olivacea</i>	10	6	30	8.1
Striated Thornbill	<i>Acanthiza lineata</i>	18	27	293	18.7
Yellow Thornbill	<i>Acanthiza nana</i>	16	10	123	17.2
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	4	11	38	3.8
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	9	6	40	5.7
Brown Thornbill	<i>Acanthiza pusilla</i>	18	6	127	34.4
Spotted Pardalote	<i>Pardalotus punctatus</i>	21	15	19	46.4
Striated Pardalote	<i>Pardalotus striatus</i>	2	2	3	5.7
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	18	3	64	23.4
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	21	13	290	70.3
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	21	40	389	50.7

¹ Surveys conducted at 21 sites.² A total of 209 surveys were conducted.

Table 1A. Summary statistics for species recorded during 2ha surveys of 20 minutes duration in Curracabundi National Park between 2010 and 2013 (cont.)

Common Name	Scientific Name	Number of survey sites recorded ¹	Maximum number in one survey	Total birds in all surveys	Reporting rate of all surveys ² (%)
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	1	1	1	0.5
Bell Miner	<i>Manorina melanophrys</i>	13	50	598	31.1
Noisy Miner	<i>Manorina melanocephala</i>	5	8	34	5.7
Red Wattlebird	<i>Anthochaera carunculata</i>	5	1	7	3.8
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>	19	7	62	16.7
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	1	2	2	0.5
White-naped Honeyeater	<i>Melithreptus lunatus</i>	12	20	112	14.8
Noisy Friarbird	<i>Philemon corniculatus</i>	20	12	111	23.4
Spotted Quail-thrush	<i>Cinclosoma punctatum</i>	3	2	9	2.9
Eastern Whipbird	<i>Psophodes olivaceus</i>	16	6	110	29.7
Varied Sittella	<i>Daphoenositta chrysoptera</i>	3	3	9	1.4
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	7	5	22	45.3
Cicadabird	<i>Coracina tenuirostris</i>	14	2	19	9.1
White-winged Triller	<i>Lalage tricolour</i>	1	1	1	0.5
Crested Shrike-tit	<i>Falcunculus frontatus</i>	2	1	2	1.0
Golden Whistler	<i>Pachycephala pectoralis</i>	21	2	102	42.6
Rufous Whistler	<i>Pachycephala rufiventris</i>	16	5	28	11.0
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	21	3	117	45.0
Australasian Figbird	<i>Sphecotheres vieilloti</i>	2	2	3	1.0
Olive-backed Oriole	<i>Oriolus sagittatus</i>	10	3	20	7.2
Dusky Woodswallow	<i>Artamus cyanopterus</i>	1	3	6	1.4
Grey Butcherbird	<i>Cracticus torquatus</i>	12	2	25	10.5
Pied Butcherbird	<i>Cracticus nigrogularis</i>	5	2	11	3.8
Australian Magpie	<i>Cracticus tibicen</i>	12	5	46	16.3
Pied Currawong	<i>Strepera graculina</i>	21	26	300	44.0
Rufous Fantail	<i>Rhipidura rufifrons</i>	2	1	2	1.0
Grey Fantail	<i>Rhipidura albiscapa</i>	21	6	201	50.7
Willie Wagtail	<i>Rhipidura leucophrys</i>	10	6	61	17.7
Australian Raven	<i>Corvus coronoides</i>	5	3	13	4.3
Little Raven	<i>Corvus mellori</i>	6	7	18	4.3
Leaden Flycatcher	<i>Myiagra rubecula</i>	10	4	20	6.2
Restless Flycatcher	<i>Myiagra inquieta</i>	1	1	1	0.5
Black-faced Monarch	<i>Monarcha melanopsis</i>	8	3	20	5.3
Magpie-lark	<i>Grallina cyanoleuca</i>	4	2	15	5.3
Jacky Winter	<i>Microeca fascinans</i>	6	3	31	8.6
Scarlet Robin	<i>Petroica boodang</i>	1	1	1	1.0
Rose Robin	<i>Petroica rosea</i>	9	1	10	5.7
Eastern Yellow Robin	<i>Eopsaltria australis</i>	21	3	86	35.9
Rufous Songlark	<i>Cincloramphus mathewsi</i>	1	2	2	1.4
Silveryeye	<i>Zosterops lateralis</i>	18	15	220	27.8
Welcome Swallow	<i>Hirundo neoxena</i>	5	10	36	7.2
Tree Martin	<i>Petrochelidon nigricans</i>	2	12	43	2.9
Mistletoebird	<i>Dicaeum hirundinaceum</i>	8	5	19	6.7
Double-barred Finch	<i>Taeniopygia bichenovii</i>	2	9	18	1.9
Red-browed Finch	<i>Neochmia temporalis</i>	20	40	394	28.7

¹ Surveys conducted at 21 sites.² A total of 209 surveys were conducted.

Table 1B. Fifteen species recorded outside of survey time limits or in other areas of the park

Common name	Scientific name	Details
Australian Brush-turkey	<i>Alectura lathami</i>	One bird on the Mernot track between Sites 3 and 4 in April 2012.
White-headed Pigeon	<i>Columba leucomela</i>	One or more birds feeding in fig trees overhanging the Barnard River Site, 16 February 2013.
Common Bronzewing	<i>Phaps chalcoptera</i>	Single birds foraging on the track at Mernot Sites 4 and 7, in May 2010 and November 2011.
Australian Owlet-Nightjar	<i>Aegotheles cristatus</i>	Heard from Homestead Site 17, January 2010.
Pied Cormorant	<i>Phalacrocorax varius</i>	One bird flying up the Barnard River at Site 16, July 2013.
White-necked Heron	<i>Ardea pacifica</i>	One bird flying up the Barnard River at Site 17, November 2011.
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Single birds over the Barnard River in September 2010 and April 2012.
Australian Hobby	<i>Falco longipennis</i>	Observed from the Homestead Site 17 in January 2010 and February 2013.
Buff-banded Rail	<i>Gallirallus philippensis</i>	One bird foraging in the Homestead garden Site 17, January 2010.
Galah	<i>Eolophus roseicapillus</i>	Single birds recorded from the Homestead Site 17, flying towards Giro Station, January and May 2010.
Southern Boobook	<i>Ninox novaeseelandiae</i>	Heard from Homestead Site 17 several times and at Site 3, November 2011.
Regent Bowerbird	<i>Sericulus chrysocephalus</i>	Seen after time at Site 3, 31 January 2010 and at ruined cottage site on 30 January 2010.
Fairy Martin	<i>Petrochelidon ariel</i>	Several birds observed at Curricabark Site 10, February 2013.
Bassian Thrush	<i>Zoothera lunulata</i>	Single bird flushed on the track near Mernot Site 5, September 2010.
Common Myna	<i>Sturnus tristis</i>	Two birds observed from Homestead Site 17 in January and May 2010.

Table 2. Species listed as Vulnerable under the NSW *Threatened Species Conservation Act 1995*

Common name	Scientific name	Details
Wompoo Fruit-Dove	<i>Ptilinopus magnificus</i>	Four recorded Site 16 August 2011 foraging in fig trees flanking river.
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	Present in steep woodland, usually in groups of two or three, where <i>Allocasuarina</i> sp. present and once at Barnard River Site 16. Maximum number at one time, 11 perched in dead tree at Site 7 August 2011.
Speckled Warbler	<i>Chthonicola sagittata</i>	Recorded seven times in open woodland with good shrub layer and thick grass at Sites 9, 16, 17, MT1 and MT2. Site 16 was deserted after floods mid 2011 when most small birds moved up hill to Site 17, including the warblers.
Varied Sittella	<i>Daphoenositta chrysoptera</i>	Groups of three recorded at Site 8 May 2010, Site 9 February 2011 and Site MT1 May 2011.
Scarlet Robin	<i>Petroica boodang</i>	One recorded at Site 17 July 2012 and a pair April/July 2012 at Site 16.

Table 3. Spring and autumn migration movements

Month / year	Observations
May 2010	Parties of Noisy Friarbirds, Australasian Figbirds, Yellow-faced Honeyeaters and Silvereyes flying over the Homestead Site 17 from the ridge behind, down to and following the Barnard River.
September 2010	Parties of Spotted Pardalotes and Yellow-faced Honeyeaters flying over the Homestead Site 17 and ridge behind, north and west into Mernot and Curricabark Creek valleys.
August 2011	Yellow-faced and White-naped Honeyeaters and Silvereyes migrating in small groups, flying up the Barnard River valley and over the Homestead into Mernot and Curricabark Creek valleys. Many Scarlet Honeyeaters present.
April 2012	Small parties of Yellow-faced Honeyeaters passing over the Homestead south to the Barnard River, some stopping to feed in flowering grevillea in the garden.
February 2013	Noisy Friarbirds at Site 4 exhibiting pre-migratory behaviour, calling and assembling.

Table 4. Observations and calls recorded of nocturnal species

Species	Observations
Tawny Frogmouth <i>Podargus strigoides</i>	Recorded during survey at Site 17 January 2010.
White-throated Nightjar <i>Eurostopodus mystacalis</i>	Heard at night calling from the hillside behind the Homestead in January 2010 and two flushed during survey at Site 3 November 2011.
Australian Owlet-nightjar <i>Aegotheles cristatus</i>	Heard once at the Homestead in January 2010.
Southern Boobook <i>Ninox novaeseelandiae</i>	Heard at night on several occasions from the Homestead Site 17 and once at Site 3 November 2011.

Table 5. Sightings recorded of raptor species

Species	Observations
Black-shouldered Kite <i>Elanus axillaris</i>	A pair seen from the Homestead Site 17, February 2013 and recorded at Sites 10, 11 and 12A in the Curricabark Valley.
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	Single adult and an immature observed flying over the Barnard River in September 2010 and April 2012 respectively.
Brown Goshawk <i>Accipiter fasciatus</i>	Recorded at Site 17 and Sites 7 and MT2 Mernot Track and Sites 11, 12 and 12A Curricabark Track.
Grey Goshawk <i>Accipiter novaehollandiae</i>	Recorded November 2011 at Sites 14 and 15 Curricabark Track. Second sighting possibly the same bird or mate of one at Site 14.
Wedge-tailed Eagle <i>Aquila audax</i>	A pair usually seen from the Homestead Site 17 and in the Curricabark and Mernot Creek valleys. Two adults observed May 2010 harassing two immature eagles at Site 17. Recorded all visits.
Nankeen Kestrel <i>Falco cenchroides</i>	A pair recorded at the Homestead Site 17 in January, May and September 2010, but not since.
Brown Falcon <i>Falco berigora</i>	One or two recorded in open areas of the Curricabark Valley at Sites 10, 11 and 12.
Australian Hobby <i>Falco longipennis</i>	Recorded at Homestead Site 17 in January 2010 and February 2013.
Black Falcon <i>Falco subniger</i>	An unusual record of one at Site 10 Curricabark valley in February 2013.

DISCUSSION

The intention of this initial paper is to place on record the inventory of bird species present in the areas of Curracabundi National Park surveyed during the period 2010-2013 and to draw general conclusions related to the objectives of this study. A subsequent paper will provide more detailed discussion of the distribution of species between the survey sites with a focus on the importance of different habitat types.

While the statistics presented in **Tables 1A** and **1B** are considered to provide a comprehensive inventory of the birds of Curracabundi National Park and their relative abundance, there are some caveats. Recording birds during surveys depends heavily on detection by call. Certain species advertise their presence loudly in response to the disturbance caused during a survey and are easily detectable. The most frequently recorded species, the Lewin's Honeyeater *Meliphaga lewinii* (RR 70.3%; 21 survey sites) being a typical example. Others like the Eastern Yellow Robin *Eopsaltria australis* (RR 35.9%) and Grey Shrike-thrush *Colluricincla harmonica* (RR 45.0%) were also recorded at every site, although both were only present in small numbers. Seasonal variations in the intensity of calling may impact on the detectability of some species. Other species present in small numbers may be under-reported because of their cryptic nature, while migratory species are only present seasonally.

Numbers of migratory species in particular increased when passing through the study area during spring and late summer, examples being Spotted Pardalote *Pardalotus punctatus*, Yellow-faced Honeyeater *Lichenostomus chrysops* and White-naped Honeyeater *Melithreptus lunatus*. The effectiveness of mid-summer surveys in woodland sites was adversely affected by the presence of large noisy Bell Miner *Manorina melanophrys* colonies and by loud cicada calls which masked other bird calls.

Superb Fairy-wrens *Malurus cyaneus* (RR 46.4%; 20 survey sites), usually absent from woodland sites, were often present in large family groups in open grassy areas and track edges. Pied Currawongs *Strepera graculina* (RR 44.0%; 21 survey sites) formed large flocks in winter, particularly around fruiting fig trees lining the Barnard River Site 16. Crimson Rosellas *Platycercus elegans* formed flocks in winter, particularly near the Homestead Site 17, and

feeding parties of smaller species were recorded at woodland sites.

The 15 species recorded outside of survey time limits (**Table 1B**) tended to be those that are normally present in small numbers. The small flock of Fairy Martins *Petrochelidon ariel* noted in February 2013 could have been passing through as no other sightings were made and no signs of breeding observed.

Cryptic species resident year round might reveal themselves more openly depending on weather conditions or time of year, such as a spike in Spotted Quail-thrush *Cinlosoma punctatum* and Brown Quail *Coturnix ypsilophora* sightings in May 2011.

There was a marked difference in species variety and numbers between steep dry north and north-west facing woodland, wet rainforest gullies facing south and south-east, and open grassy riverine sites edged with forest, such as the latter surrounding the Homestead and Barnard River Sites 16 and 17 and the open grassy valley around Curricabark Creek Sites 10 and 11. In addition it was more difficult to locate birds when large colonies of Bell Miners were present, particularly along the Mernot Creek track between Sites 4 and 7, making it difficult to hear other bird calls and because they are known to exclude congeners.

The least number of species were recorded at the most distant sites, Curricabark Creek Sites 13, 14 and 15 and Mernot Site MT3 (between 7 and 10km from the Homestead). Although the former were only surveyed seven times and the latter eight times, the nature of these sites is such that they are considered unlikely to show much increase in bird abundance if surveyed more frequently, although it could result in an increase in species diversity. Bird presence decreased the higher one penetrated the creek beds as they became narrower, darker and more densely edged with casuarinas and vines.

Over the three years of surveys, shrub and tree regrowth in the cleared grassy areas at Sites 1, 9, 10, 11, 12, 13 and 14, was beginning to change the nature of these sites, and may in time alter species composition unless fire limits regrowth. However, regrowth of rainforest vegetation in the gully Sites 5 and 6 on Mernot Track may take many years to markedly change the habitat, partly due to heavy vine growth strangling young rainforest trees. Their present more open character should continue to attract the same species in the near future.

Taking into account the wide range of weather conditions that Australia is noted for and which were experienced during the three years of this project, field surveys conducted over a limited time will not record every species likely to be present. Weather conditions in the study area and the east coast of Australia generally are unpredictable and in this instance impacted on several occasions on this study's results. For instance heavy rainfall higher up the catchment made creeks unfordable in May 2010 and September 2010 and flooding of the Barnard River causeway in 2012 forced the cancellation of two survey visits. These variations in conditions may impact both short-term and longer-term changes in the diversity of bird populations. Consequently, it is anticipated that further survey effort in this section of Curracabundi National Park would increase the species list for the study area. Unfortunately the intensive short duration survey method used in this study did not provide time for detailed assessment of bird behaviour and consequently breeding behaviour was under-reported.

CONCLUSIONS

The range of species recorded in this study (**Tables 1A** and **1B**), clearly shows that Curracabundi National Park is an important reserve for eastern Australian woodland birds, many of which are in decline as urbanisation and land clearing continues to eat away at their habitat. The presence of five threatened species strongly supports the gazetting of the area as Wilderness and National Park and its value as a vital migration link in the Great Eastern Ranges Corridor.

This study provides a baseline against which the impact of the ongoing management of the Park on its bird populations can be assessed.

ACKNOWLEDGEMENTS

This project would not have been possible without the dedicated support of the following people who carried out the surveys, many risking damage to their 4WD

vehicles in the difficult terrain, for which they have my undying admiration and thanks. Steve and Pippa Robinson, Jeff and Hilary Kite and Terry Hardwick from the Gloucester Environment Group. Liz Crawford, Chris Herbert, Ann Lindsey, Lorna Mee, Mike Newman and Alan Stuart from the Hunter Bird Observers Club. Ted Nixon and, on one occasion each, Charlie Andrews, Susie Giuffre, Sue Kitchen and Graeme Stevens from Birding NSW Sydney, and Ann Mannion and Rod Cox from the Manning River Bird Watchers. Thanks must also go to staff at National Parks & Wildlife Service, Gloucester office, for their strong support and for granting use of *Karamea* Homestead during the surveys, and in particular to Terry Evans (Manager to 2010) and Antony Signor, Manager from 2010, and, most importantly, Sean Thompson (ranger for Curracabundi) who assisted with the setting up and marking of survey sites, provided weather information and checked tracks were clear of fallen trees and creeks passable. I would especially like to thank Mike Newman for his support throughout the project and for his encouragement and wise advice in writing up this paper.

REFERENCES

- Debus, S.J.S., Ford, H.A. and Page, D. (2007). Bird communities in remnant woodland on the New England Tablelands, New South Wales. (Division of Zoology, University of New England: Armidale, NSW.)
- Hyem, E.L. (1979). Observations on Owls in the Upper Manning River District, N.S.W. *Corella* 3(2): 17-25.
- Ian Jack Heritage Consulting. (2007). Conservation Management Strategy for Karamea within Curracabundi Historic Precinct, Curracabundi National Park. (Report to the Department of the Environment and Climate Change, December 2007. Unpublished.)
- NPWS (2014). Statement of Management Intent: Bretti, Camels Hump, Mernot and Monkeycot nature reserves, Curracabundi and Woko national parks and Coneac and Curracabundi state conservation areas. (<http://www.environment.nsw.gov.au/managementintent/CurracabundiNationalPark.htm>)
- Stuart, A. (Ed.) (1994-2014). Hunter Region of New South Wales Annual Bird Report Numbers 1 to 21 (1993-2013). (Hunter Bird Observers Club Inc: New Lambton, NSW)

APPENDIX

Survey site locations and basic habitat descriptions

- Site 1** Homestead Track – 10 Surveys (31° 40' 07" S, 151° 44' 40" E) BLA Birdata Site ID 20125. Track behind Homestead rising steeply through cleared woodland with grass, weeds and regrowth of *Acacia* sp., facing south-east over the Barnard River valley.
- Site 2** Homestead Track – 10 Surveys (31° 40' 14" S 151° 43' 56" E) BLA Birdata Site ID 20126. Track through regrowth woodland, mainly *Acacia* sp., on steep dry stony hillside with shrubs, vines, lantana and *Xanthorrhoea* sp. in drainage line.
- Site 3** Homestead Track – 10 Surveys (31° 40' 18" S 151° 43' 56" E) BLA Birdata Site ID 20127. A clearing at top of steep-sided ridge with dry dam; view through acacia/eucalypt woodland into Curricabark and Barnard valleys.
- Site 4** Mernot Track – 10 Surveys (31° 40' 21" S 151° 43' 23" E) BLA Birdata Site ID 20128. Steep closed canopy, grassy eucalypt/allocasuarina woodland on sharp bend in track with one small fig and sparse understorey shrubs.
- Site 5** Mernot Track – 10 Surveys (31° 40' 23" S 151° 43' 00" E) BLA Birdata Site ID 20129. Rainforest over deep drainage line with regrowth, thick grass, dense creepers and introduced weeds, and dry eucalypt/acacia open forest above the track.
- Site 6** Mernot Track – 10 Surveys (31° 40' 35" S 151° 42' 46" E). BLA Birdata Site ID 20130. Steep track with remnant rainforest below and dry eucalypt/acacia open woodland above.
- Site 7** Mernot Track – 10 Surveys (31° 40' 45" S 151° 42' 18" E) BLA Birdata Site ID 20131. Ford over Mernot Creek in deep gully, lined with casuarinas *Casuarina cunninghamiana*, lilly pillies and other rainforest shrubs.
- Site 8** Curricabark Track – 10 Surveys (31°40' 25" S 151° 44' 10") BLA Birdata Site ID 20132. Steep mixed dry woodland with rainforest gully falling to valley below.
- Site 9** Curricabark Track – 9 Surveys (31° 40' 36" E 151° 44' 21" E) BLA Birdata Site ID 20133. Steep mixed dry woodland with rainforest gully giving way to grassland with regrowth encroaching, overlooking the valley.
- Site 10** Curricabark Track – 10 Surveys (31° 40' 54" S 151° 44' 31" E) BLA Birdata Site ID 20134. Drainage gully in open grassland with some large casuarinas and remnant rainforest shrubs/trees and weeds, including false tobacco.
- Site 11** Curricabark Track – 10 surveys (31° 41' 03" S 151° 44' 34" E) BLA Birdata Site ID 20135. Woodland edging Curricabark Creek, with casuarinas, remnant rainforest and regrowth, and cattle yards in open grassland with remnant forest eucalypts. Evidence of feral bulls present at most survey visits.
- Site 12** Curricabark Track – 8 Surveys (31° 41' 24" S 151° 44' 25" E) BLA Birdata Site ID 20136. Cleared grassy ridge with two large eucalypts surrounded by lantana and weeds, falling steeply down into rainforest creek gully. By February 2013 advancing regrowth of acacia and *Dodonea* sp. and introduced weeds was starting to change the habitat.
- Site 12A** Curricabark Track – 8 Surveys (31° 41' 24" S 151° 44' 15" E) BLA Birdata Site ID 20169. Curricabark Creek with grassy banks, lantana and other weeds, edged with rainforest and eucalypt woodland. Evidence of feral bulls at most surveys.
- Site 13** Curricabark Track – 7 Surveys (31° 41' 40" S 151° 43' 28" E) BLA Birdata Site ID 20137. Cleared grassy ridge surrounded by dry eucalypt woodland sloping steeply to Curricabark Creek. Regrowth starting to encroach.
- Site 14** Curricabark Track – 7 Surveys (31° 41' 40" S 151° 43' 09") BLA Birdata Site ID 20138. Steep grassy ridge and track surrounded by dry eucalypt woodland with regrowth encroaching from the edges.
- Site 15** Curricabark Track – 7 Surveys (31° 41' 54" S 151° 47' 35" E) BLA Birdata Site ID 20139. This deep gully is the final site on the Curricabark track, the old track beyond the creek being overgrown and impassable. Large *Casuarina cunninghamiana* trees line the grassy creek bed with rainforest trees, shrubs and a few weeds, and open woodland above.
- Site 16** Barnard River – 10 Surveys (31° 40' 05" S 151° 45' 05" E) BLA Birdata Site ID 20140. River flats with White Cedars *Melia azedarach*, a large dead eucalypt and shrubs looking across the river to a cliff face with massed fig trees at base, grass trees, lantana and other trees/shrubs on almost vertical stony slope with eucalypts on the ridge above. Several severe floods in mid-2011 cleared the river flats of most vegetation and removed the dead tree, leaving a deep layer of gravel.
- Site 17** Karamea Homestead – 10 surveys (31° 39' 57" S 151° 44' 54" E) BLA Birdata Site ID 20141. Homestead with fenced garden containing exotic and native trees, shrubs and fruit trees, backed by an overgrown vegetable garden on the west, cleared drainage line with exotic pines on the east, areas of mown grass in front leading to weedy steep river bank facing south-east over the Barnard River and down the valley.
- Site MT1** Mernot Track – 8 Surveys (31° 40' 50" S 151° 42' 15" E) BLA Birdata Site ID 20170. Steep dry ridge of grassy woodland with allocasuarinas, angophoras and shrubs, edged by rainforest and eucalypt woodland. Eight surveys were carried out following clearance of the track by NPWS staff.
- Site MT2** Mernot Track – 8 Surveys (31° 41' 05" S 151° 42' 08" E) BLA Birdata Site ID 20171. Grassy promontory surrounded on three sides by Mernot Creek, with eucalypts, rainforest and understorey shrubs, and weedy scrub and false tobacco encroaching from the edges. Eight surveys were carried following clearance of the track by NPWS staff.
- Site MT3** Mernot Track – 8 Surveys (31° 41' 09" S 151° 41' 57") BLA Birdata Site ID 20172. Narrow stony rainforest gully formed by the creek and lined with *Casuarina cunninghamiana*, vines and scrub. Eight surveys were carried out following clearance of the track by NPWS staff.